

## **C.4**

TO: City Council

FROM: Rosemarie Ives, Mayor

DATE: March 15, 2005

SUBJECT: **APPROVAL OF INTERLOCAL AGREEMENT WITH KING COUNTY FOR REDMOND-BEAR CREEK GROUNDWATER COMMITTEE AND GENERAL UPDATE ON REDMOND'S WELLHEAD PROTECTION PROGRAM**

### **I. RECOMMENDED ACTION**

Move to approve the Interlocal Agreement between King County and the City of Redmond for regional groundwater protection activities, and authorize the Mayor to appoint a staff member to serve as the City of Redmond's authorized representative for the Redmond-Bear Creek Groundwater Committee.

### **II. DEPARTMENT CONTACT PERSONS**

David Rhodes, Director of Public Works	556-2705
Bill Campbell, City Engineer/Assistant Director of Public Works	556-2733
Jon Spangler, Natural Resources Division Manager	556-2823
Tom Barry, Natural Resources Engineering Section Manager	556-2870

### **III. DESCRIPTION**

#### **A. Redmond-Bear Creek Groundwater Committee:**

In response to growing concern about Washington State's groundwater resources, the state legislature amended Chapter 90.44 RCW in 1985, to assist local governments with coordinating and better managing shared groundwater resources. As part of this process, the Washington State Department of Ecology (WSDOE) established procedures for designating groundwater management areas and developing comprehensive groundwater management programs for these areas under Chapter 173-100 WAC. King County and the City of Redmond petitioned WSDOE to designate the Redmond-Bear Creek Valley as a Groundwater Management Area to seize the opportunity provided by the State Legislature and WSDOE to protect groundwater in this region. WSDOE, after public hearing, designated the Area on October 7, 1986.

The Redmond-Bear Creek Groundwater Committee (RBCGC) oversees the regional activities within the Management Area and is comprised of many different groups that manage, develop, and/or rely on groundwater. It is also in line with the Council's identified "pillar" of regionalism. Participants in the Redmond-Bear Creek Groundwater Management Area (Attachment A) include representatives from area cities, local citizens and businesses, water purveyors, the environmental community, and state/local government. Entering into the interlocal agreement (Attachment B) will allow the City of Redmond to designate its own representative to serve as authorized agent on the Committee. The agreement establishes a framework for clearly identifying the roles, responsibilities, and operating protocols between King County and each of the participating agencies, and it leverages City funds and staff time in the acquisition and utilization of regional groundwater data, programs, projects and services. Major services identified in the Scope of Work (Attachment C) include a detailed regional water resources evaluation; regional data collection, integration, mapping and management; regional policy review, development, and coordination; and regional groundwater education and outreach activities.

## **B. Update on Redmond's Wellhead Protection Program:**

### Background:

On October 21, 2003, the City Council approved the Wellhead Protection Ordinance establishing the regulatory framework and authority to safeguard its underground municipal drinking water supply. The ordinance was the product of nearly a decade of regional and local technical studies and collaborative meetings. Since adoption of the Wellhead Protection Ordinance, Natural Resources staff has begun implementing the various program elements outlined in the Implementation and Program Plan. For example, development review standards and hazardous materials information collection program elements have already been implemented. Inspection and monitoring program elements will be developed shortly, followed by the development of a capital improvement program plan.

### Accomplishments:

In June of 2004, Kevin Murphy was hired to lead the Wellhead Protection Program. Mr. Murphy is a licensed geologist who comes to the City with 20 years of geological experience and 15 years of environmental compliance, investigation and remediation expertise.

In August of 2004, Rebecca Borker joined the program as the environmental technician. Ms. Borker comes to the City with a B.S. in Watershed Management and nine years of experience in hydrologic investigations, groundwater monitoring and sampling.

Since their hiring, more than 1,800 Hazardous Materials Questionnaires (HMQ), developed in collaboration with the business community, were distributed to local businesses and facilities in September, 2004. The response from the business community was excellent –a return rate of over 90%. The responses to the questionnaires enabled staff to generally determine the types and quantities of hazardous materials that are being used in critical areas around the city. An unforeseen advantage of the HMQ collection process included locating hundreds of businesses that moved, closed, or were operating without a business license. This information was provided to Business License staff and resulted in efficiencies in both programs and additional City revenue.

Program staff have also strengthened relationships with state and local agencies such as King County (Natural Resources and Solid/Hazardous Waste), Washington State Department of Ecology, and Washington State Department of Health, resulting in improved interagency coordination and collaboration on local environmental remediation and/or problem sites. These relationships ensure that Redmond's interests will be heard and considered in matters affecting and/or impacting local groundwater quality and environmental health. In addition, staff have developed and strengthened important relationships with local environmental consulting firms, increasing the awareness of local groundwater concerns and improving the response to contaminated sites. In fact, City staff have been actively involved in more than a dozen developing and contaminated property investigations, improving outcomes and expediting results. While the Wellhead Protection Program's facility inspection program is still in development, over a dozen local businesses have requested advanced inspections in an effort to responsibly improve their operations to reduce their environmental liability and prevent pollution.

#### Next Steps:

Staff is continuing to pursue an aggressive schedule for program implementation. Integration of the hazardous materials information collected from businesses will be evaluated and queried in May, 2005. Each facility that uses, stores or disposes 20 gallons or 200 pounds of hazardous materials will be asked to prepare and submit a Hazardous Materials Inventory Statement (HMIS), providing detail of the nature, location and quantities of hazardous materials at their facility. Those facilities which use, store or dispose of quantities exceeding 50 gallons or 500 pounds of hazardous materials will be asked to prepare a Hazardous Materials Management Plan (HMMP). The plan will provide detailed descriptions of materials use, handling and spill response procedures, and document employee training and materials inspections. Both the HMIS and HMMP submittals are being coordinated with Redmond's Fire Department to ensure that the needs of both departments are met concurrently.

Contaminant inventory, facility inspection and groundwater monitoring programs are under development and will be implemented over the next 18 months. Groundwater monitoring wells will be used to evaluate groundwater quality and flow direction within the Critical Aquifer Recharge Area to monitor contaminant source quantities

and movements. Monitoring data will also be used to measure the effectiveness of the hazardous materials management program.

#### **IV. IMPACT**

##### **A. Service Delivery:**

Approval of the Interlocal Agreement (ILA) between the City of Redmond and King County will provide the means to cooperatively conduct and fund regional groundwater protection activities. Utilizing a regional approach is a cost-effective and efficient means to obtain additional regional hydrogeologic data for the Redmond-Bear Creek Valley Groundwater Management Area, evaluate regional land use plans and policies affecting groundwater quality and quantity in the Management Area, and realize economies of scale in conducting community education and outreach activities aimed at promoting groundwater awareness and protection.

##### **B. Fiscal:**

The cost to fully finance Redmond's portion in the Contract for Services is \$40,000 per annum for three years (\$120,000). The current 2005-06 budget includes \$80,000 in Water/Wastewater Operations and is identified for this purpose. This funding amount represents about 19% of the total cost for services for the project with 57% being borne by King County and the other 24% being borne by the regional partners.

#### **V. ALTERNATIVES**

Council could choose not to participate in the Redmond-Bear Creek Groundwater Committee and reject the ILA, Scope of Work, and subsequent financing. This action would deny Redmond a seat at the Committee and remove Redmond from participating, influencing, and benefiting from regional groundwater protection studies and program activities.

**VI. LIST OF ATTACHMENTS**

- A. Redmond-Bear Creek Groundwater Management Area Map
- B. Redmond-King County Interlocal Agreement
- C. Redmond-Bear Creek Groundwater Committee Scope of Work

**s/s**

David Rhodes, Director of Public Works

**3/4/05**

Date

Approved for Council Agenda

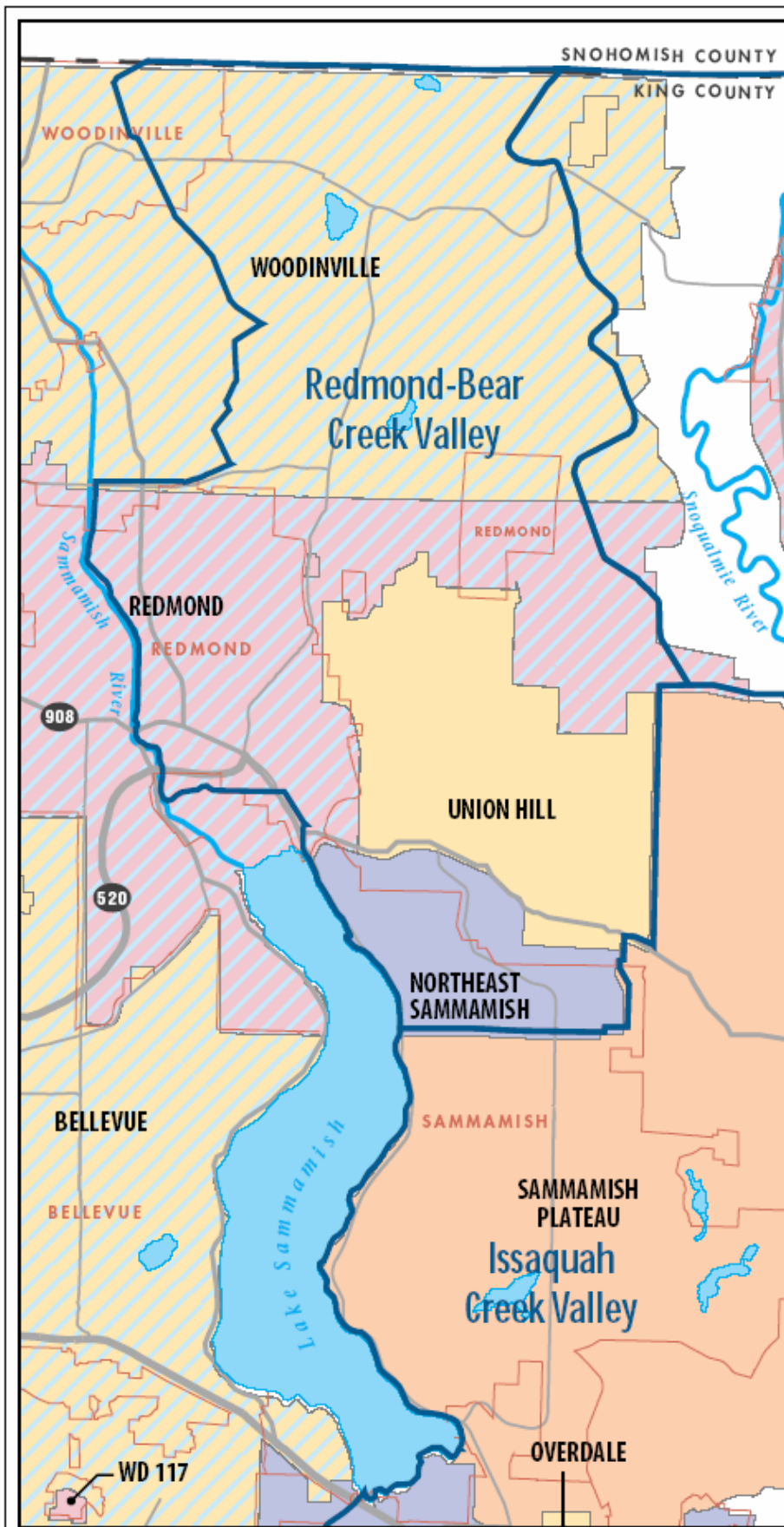
**s/s**

Rosemarie Ives, Mayor

**3/5/05**

Date

# Attachment A



## REDMOND GROUNDWATER MANAGEMENT AREA

 Majority of Water Provided by Seattle Public Utilities

**Name** GWMA Name

**NAME** Water Utility Name

**NAME** City Name

 City Boundary

 Groundwater Mgmt. Area Boundary



0 1 2 Miles

February 2005

The map is based on the most accurate information available and is intended for planning purposes. Contact King County Technical Resource Center for more information and updates.

The information included on this map has been compiled from a variety of sources and is subject to change without notice. King County makes no representations or warranties, express or implied, as to accuracy, completeness, timeliness, or rights to the use of such information. King County shall not be liable for any general, special, indirect, incidental, or consequential damages including, but not limited to, lost revenues or lost profits resulting from the use or misuse of the information contained on this map. Any sale of this map or information on this map is prohibited except by written permission of King County.

Map produced by:  
King County WLRD Visual Comm. & Web Unit

Data sources:  
Water Utility Service Area, Incorporated Areas, GWMA's and other layers from standard King County datasets obtained February 2005.

File name:  
0502\_RedmondGWMA.ai LPR

 **King County**  
Department of  
Natural Resources and Parks

## **Attachment B**

This Agreement is entered into by King County, Washington, hereinafter referred to as "King County" or the "County," the City of Redmond, hereinafter referred to as "Redmond," the City of Woodinville, hereinafter referred to as "Woodinville," and the City of Sammamish, hereinafter referred to as "Sammamish," collectively referred to as the "Parties," for the purpose of cooperatively conducting activities related to groundwater protection and management in the Redmond-Bear Creek Groundwater Management area.

WHEREAS, the Washington State Department of Ecology (DOE) has been authorized by RCW 90.44.400 and its implementing regulations, WAC 173-100, to identify and designate groundwater management areas for the purposes of protection of water quality, assurance of quantity, and efficient management of water resources to meet future needs, and;

WHEREAS, in 1986 DOE designated the Redmond-Bear Creek Groundwater Management Area (hereinafter "Management Area"), and;

WHEREAS, DOE designated the Seattle/King County Department of Public Health as the lead agency to work with stakeholders and potential implementing agencies to develop the Redmond-Bear Creek Valley Groundwater Management Plan (hereinafter "Management Plan"), and;

WHEREAS, in 1996 the King County Department of Natural Resources replaced the Seattle/King County Department of Public Health as the lead agency in connection with the development of the Management Plan;

WHEREAS, the Management Plan, after completion of a review and concurrence process by local stakeholders, governments and service providers, was submitted to DOE in March 1999 for review and certification, and;

WHEREAS, the Management Plan was certified by the DOE in 2000 as consistent with the intent of WAC 173-100, and;

WHEREAS, under the provisions of RCW 90.44.420, affected local governments are charged with adopting regulations, ordinances and/or programs for implementing those provisions of the Management Plan which are within their respective jurisdictional authorities, and;

WHEREAS, in 2001, the King County Council in Ordinance 14214, codified as part of King County Code 9.14, formally authorized the County's Groundwater

Protection Program and in Ordinance 14276, codified as part of King County Code 9.14, formally provided for the creation of the Redmond-Bear Creek Groundwater Protection Committee (hereinafter “Committee”), and;

WHEREAS, the current members of the Committee were appointed by the King County executive and confirmed by the King County Council in 2002, and have been routinely meeting since December 2002 to participate in implementation of the Management Plan, and;

WHEREAS, the Management Area lies within all or portions of King County, the cities of Redmond, Sammamish, and Woodinville, each of which is a Party to this Agreement, and;

WHEREAS, the Parties are each considered to be an implementing agency for the Management Plan and for the specific management strategies identified within the Plan, and;

WHEREAS, each of the Parties has a role and responsibility in addressing groundwater issues and concerns in the Management Area, and;

WHEREAS, the current Committee has identified its top priorities for implementation of the Management Plan and for groundwater protection generally within the Management Area; and

WHEREAS, the Parties wish to work together to address and implement the Committee’s priorities and to protect groundwater in general, and wish to use King County’s services to conduct specific groundwater protection activities, including increased monitoring, enhanced coordination among the Parties, and improved policies and regulations, and;

WHEREAS, the Parties intend that by working cooperatively to conduct the activities provided for in this Agreement they will be taking important steps on behalf of the public to protect the quantity and quality of groundwater in the Management Area , which is threatened by contaminant sources and increasing water supply demand, and;

WHEREAS, pursuant to RCW 39.34, the Interlocal Cooperation Act, each of the Parties is authorized to enter into an agreement for cooperative action;

NOW THEREFORE, the Parties hereto agree as follows:



## **I. Purpose of the Agreement**

The purpose of this Agreement is to provide the means by which the Parties will cooperatively conduct and fund groundwater protection activities. These activities are listed below in four general subject matter areas and will be conducted in the years 2005 through 2007. They are more specifically described in the Scope of Work attached to this Agreement as Exhibit One and incorporated herein and are collectively referred to herein as the “Project.” The four activities include:

1. providing staff support to the Committee;
2. evaluating land use and other policies affecting groundwater quality and quantity;
3. obtaining additional hydrogeologic data for the Management Area; and
4. conducting community education and outreach activities aimed at promoting groundwater awareness and protection and facilitating an annual groundwater education forum.

## **II. Project Management**

- A. Project oversight will be conducted by a Project Management Team (hereinafter “PMT”) consisting of one representative each from King County, Redmond, Woodinville, and Sammamish. Each Party will designate its respective PMT representative.
- B. The PMT will meet at least three times per year and will conduct additional meetings as needed to review Project progress, solicit and consider input on the Project from the Committee, and review Project expenditures per the Project budget, and consider possible changes to the Project Scope of Work.
- C. The PMT may make needed changes to the Scope of Work to reflect emerging Project results and findings and to better meet Project objectives. Such changes shall not cause total annual Project costs as provided for in Exhibit One to be exceeded.
- D. In the case of one or more Parties terminating participation in the Agreement pursuant to Agreement Section VI.B., the PMT shall amend the Scope of Work such that each remaining Party’s annual cost share does not exceed the dollar amount for that Party shown in the “Project Cost Shares” table as set out on Exhibit One page 11.

- E. In the case that insufficient additional revenues are received that are otherwise anticipated to cover Project Costs, as described in Agreement Section IV., the PMT shall amend the Scope of Work to reduce Project costs by the amount of additional revenue not received.
- F. Any amended Scopes of Work must be signed by all PMT members to become effective.
- G. King County will perform day-to-day project management and direction and communicate with other PMT members as needed to conduct Project activities. Project management activities will include processing any amendments to the Scope of Work for signature by PMT members and providing PMT members with fully executed copies.
- H. King County will schedule, facilitate, and provide summaries of all PMT meetings during implementation of the Project.
- I. The PMT will reach its decisions by consensus, considering input from the Committee where appropriate. Issues that cannot be resolved by the PMT will be referred to the Division Director of the King County Water and Land Resources Division and the appropriate City Managers for final resolution.

### **III. Responsibilities**

- A. Each of the Parties shall:
  - 1. Designate one representative to serve on the PMT and participate in PMT meetings.
  - 2. Maintain its appointed representation on the Committee.
  - 3. Provide for use in the Project any groundwater-related data it has that would be appropriate to share and would facilitate accomplishment of the Project goals.
  - 4. Participate in the Groundwater Education Forum as outlined in the Scope of Work.
  - 5. Consider revising its groundwater protection policies and regulations to increase groundwater protection when and where it deems appropriate as recommended by the Committee.

6. Where appropriate, utilize public outreach tools developed as part of the Project to increase public awareness of groundwater issues.
  7. Pay for its share of Project costs as provided for below and in Exhibit One.
- B. King County shall have the following additional responsibilities:
1. Provide day-to-day Project management.
  2. Perform Project tasks as provided for in Exhibit One, including providing for subcontracted services where needed.
  3. Act as fiscal agent for any additional revenues received, pursuant to Agreement Section IV. D.

#### **IV. Costs**

- A. The Parties agree to share costs incurred by King County to conduct Project activities as described in Exhibit One. Total estimated Project costs are \$633,831 for the years 2005-2007.
- B. Estimated Project costs for each year, by activity, are described in Exhibit One.
- C. The Parties agree to pay for Project costs according to the percentages specified in Exhibit One on page 11. Project cost shares for each Party will not exceed the dollar amounts shown for each Party in the “Project Cost Shares” table as set out on Exhibit One page 11, without written agreement of the Parties.
- D. As indicated on the “Project Cost Shares” table on Exhibit One, a portion of revenues to cover Project costs are intended to be covered by revenues that may be forthcoming from additional revenue sources such as grants. King County is designated to be the fiscal agent to receive any additional revenue and apply it to Project costs.
- E. Total Project costs shall include all those costs incurred by King County in completing the Project, including costs for staff persons, overhead, supplies, contractors, and equipment.

**V. Billing and Payment**

- A. King County shall bill each of the other Parties quarterly on itemized invoices for that Party's share of Project costs.
- B. The Parties shall review and approve of the invoices and forward payment to King County within 60 days of receipt of invoice.
- C. The Parties represent that funds for service provision under this Agreement have been appropriated and made available. To the extent that such service provision requires future appropriations beyond current appropriation authority, the Parties' obligations are contingent upon the appropriation of sufficient funds to complete the activities described herein. If any Party does not appropriate funds to meet its future obligations for the next fiscal year, its obligations shall terminate at the end of the then-current fiscal year. In the event of such an occurrence, the remaining Parties may terminate their obligations under this Agreement or continue with a modified Scope of Work pursuant to Agreement Section II.D.

**VI. Duration, Termination, and Amendment**

- A. This Agreement is effective upon signature by the Parties and remains in effect until June 30, 2008.
- B. A Party may end its participation in the Project and withdraw from this Agreement upon at least 90 days' written notice to the other Parties, and paying its share of costs for the Project to the end of the quarter in which termination is effective.
- C. This Agreement may be amended, altered, clarified, or extended only by the written agreement of the Parties hereto.
- D. This Agreement is not assignable by any Party, either in whole or in part.
- E. This Agreement is a complete expression of the terms hereto and any oral or written representations or understandings not incorporated herein are excluded. The Parties recognize that time is of the essence in the performance of the provisions of this Agreement. Waiver of any default shall not be deemed to be a waiver of any subsequent default. Waiver of breach of any provision of this Agreement shall not be deemed to be a waiver of any other or subsequent breach and shall not be construed to be a modification of the

terms of the Agreement unless stated to be such through written approval by the Parties which shall be attached to the original Agreement.

**VII. Counterparts**

This Agreement may be executed in counterparts.

**VIII. Indemnification and Hold Harmless**

The Parties agree to the following:

Each Party shall protect, defend, indemnify, and save harmless the other Parties, their officers, officials, employees, and agents, while acting within the scope of their employment as such, from any and all costs, claims, judgments, and/or awards of damages, arising out of, or in any way resulting from, that Party's own negligent acts or omissions. Each Party agrees that its obligations under this subparagraph extend to any claim, demand, and/or cause of action brought by, or on behalf of, any of its employees or agents. For this purpose, each Party, by mutual negotiation, hereby waives, with respect to the other Parties only, any immunity that would otherwise be available against such claims under the Industrial Insurance provisions of Title 51 RCW. In the event that any Party incurs any judgment, award, and/or cost arising therefrom, including attorneys' fees, to enforce the provisions of this Article, all such fees, expenses, and costs shall be recoverable from the responsible Party to the extent of that Party's culpability.

IN WITNESS WHEREOF, the Parties hereto have executed this Agreement on the \_\_\_\_\_ day of \_\_\_\_\_, 2005.

Approved as to Form

**King County:**

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: Deputy Prosecuting Attorney

Title: King County Executive

Approved as to Form

**City of Redmond:**

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Approved as to Form

**City of Sammamish:**

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

Approved as to Form

**City of Woodinville:**

By: \_\_\_\_\_

By: \_\_\_\_\_

Title: \_\_\_\_\_

Title: \_\_\_\_\_

## REDMOND-BEAR CREEK VALLEY GROUNDWATER MANAGEMENT AREA PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007

### SUMMARY OF SERVICES AND ESTIMATED COSTS

#### I. WATER RESOURCES EVALUATION

##### SURFACE WATER/GROUNDWATER INTERACTION STUDY (2005-2007)

Geographic scope is subareas within and adjacent to GWMA

- Review previous studies.
- Develop a work plan and present it to the Redmond-Bear Creek Groundwater Protection Committee.
- Install temperature probes and mini-piezometers, and utilize other monitoring methods.
- Observe water levels and temperature fluctuations.
- Calculate interaction factors between surface water and groundwater.

Estimated Cost – Interaction Study:	\$141,600
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##### STREAM FLOW AND PRECIPITATION GAGING (2005-2007)

Geographic scope is a number of subareas across the GWMA

- Continue stream flow and precipitation monitoring.
- Install new gages as possible.
- Provide data via DNR hydrology Web pages.

Estimated Cost – Gaging:	\$210,000
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##### GEOLOGIC AND SUSCEPTIBILITY MAPPING (2005-2007)

Geographic scope is subareas within and adjacent to the GWMA

- The mapping area will be sub-areas of the Redmond-Bear Creek Valley Groundwater Management Area and adjacent areas (likely to include Cold Creek and Upper Bear Creek areas). The PMT to approve final mapping area.
- Collect subsurface geologic data (such as borehole or well logs) for mapping study area from current sources.
- Provide a database that includes both groundwater data and a list of boring logs in the mapping area.
- Perform geologic field mapping in the mapping area.
- Develop and verify geologic units for interpretation of maps and cross-sections of the mapping area.
- Update previous geologic mapping (to a 1:24,000 scale) and create geologic cross-sections for mapping area.
- Map high, medium or low susceptibility to groundwater contamination in mapping area.

Estimated Cost – Geologic Mapping:	\$89,000
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##### REDMOND-BEAR CREEK VALLEY GROUNDWATER DATABASE/WEB PAGES (2005-2007)

Geographic scope is entire GWMA

- Compile existing data.
- Program the Web pages to allow interactive data downloading.
- Update information on an annual basis.

Estimated Cost – Database/Web Pages:	\$15,400
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Water Resources Evaluation Total Estimated Cost, 2005-2007:	\$456,000
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## II. POLICY AND PLAN IMPLEMENTATION

### GROUNDWATER PROTECTION COMMITTEE AND ILA MANAGEMENT (2005-2007)

- Maintain a Redmond-Bear Creek Groundwater Protection Committee membership roster.
- Facilitate appointments for vacant committee seats.
- Handle committee logistics such as scheduling meetings and guest speakers, securing facilities, and posting public notices.
- Staff and support regular meetings of the committee.
- Develop meeting agendas in partnership with committee chairs.
- Produce meeting notes.
- Distribute notes, agendas, and other communications to committee members and interested parties.
- Serve as the liaison between the committee and the groundwater protection service providers.
- Manage and oversee completion of ILA services.
- Convene an ILA management group as needed.
- Coordinate routine status reports of progress on the ILA scope of work.
- Facilitate committee review of work performed under the ILA.

Estimated Cost – Committee and ILA Management (\$18,361/year):	\$55,083
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### GROUNDWATER POLICY AND SUBCOMMITTEE WORK (2005-2007)

- Research and analyze groundwater policy issues as identified by the Redmond-Bear Creek Groundwater Protection Committee.
- Develop policy guidance for implementing agencies in topical areas of interest to the committee.
- Provide organizational support to subcommittees as needed.

Estimated Cost – Policy and Subcommittee Work (\$7,787/year):	\$23,361
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Policy and Plan Implementation Total Estimated Cost, 2005-2007 (\$26,148/year):	\$78,444
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### III. EDUCATION AND OUTREACH

#### UPDATE TO EDUCATION WEB PAGES (2005-2007)

- Post geographically relevant survey data on the groundwater education Web pages of the King County Web site.
- Maintain a comprehensive list of groundwater materials available through Redmond-Bear Creek Valley Groundwater Management Area jurisdictions and agencies.
- Link to Snohomish County's groundwater program and to Cross Valley Water District as appropriate.
- Include links to King County, Washington State, and Federal agency materials.
- Request and integrate updates from groundwater education participants.

Estimated Cost – Web Pages (\$8,282/yr):	\$24,846
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#### EDUCATORS FORUM (2005-2007)

- Work directly with the Redmond-Bear Creek Groundwater Protection Committee.
- Coordinate logistics for the annual forum.
- Create a mailing list.
- Publicize the forum.
- Facilitate the forum.
- Participate in the forum and share King County groundwater education issues.
- Provide water quality survey results via zip-code sorting to track attitudes and behaviors.
- Prepare and present Educators Forum recommendations to the committee for comment and approval.

Estimated Cost – Educators Forum (\$16,565/yr):	\$49,695
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#### WRITING AND EDITING (2005-2007)

- Submit quarterly articles to community newsletters and other entities for publication. Topics may include the following:
  - things citizens and businesses can do to improve groundwater recharge
  - vulnerability
  - wellhead protection
  - underground storage tank maintenance
  - scientific findings
  - groundwater's role in the hydrologic cycle
  - groundwater as drinking water.

Estimated Cost – Writing and Editing (\$8,282/yr):	\$24,846
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Education and Outreach Total Estimated Cost, 2005-2007 (\$33,129/yr):	\$99,387
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# **REDMOND-BEAR CREEK VALLEY GROUNDWATER MANAGEMENT AREA**

## **PROPOSED SCOPE OF WORK FOR GROUNDWATER PROTECTION SERVICES, 2005-2007**

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### **DETAIL OF SERVICES AND ESTIMATED COSTS**

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Groundwater is important to the Redmond-Bear Creek Valley Groundwater Management Area (GWMA) in large part for the following two key reasons:

- A large portion of the population of the GWMA relies on groundwater as its source of drinking water supply. Of the Redmond supply, 40 percent comes from groundwater; of the Union Hill Water Association and the Northeast Sammamish Sewer and Water District supplies, 100 percent come from groundwater. Beyond these large systems, approximately 100 small (Group B) public water systems rely entirely groundwater.
- Groundwater is essential for sustaining habitat in the area's rivers and wetlands.

These crucial groundwater supplies can be precarious. Much of the upper Bear Creek Basin area uses on-site sewage treatment (septic) systems, which discharge directly to groundwater. In densely populated areas, there has been concern about impacts from these systems to groundwater quality.

All the rivers and streams in the GWMA (such as the Sammamish River, Bear Creek, and Evans Creek) are entirely lowland, and therefore are not sustained by snowmelt. The rivers and streams are completely dependent on groundwater storage to continue their flows through the dry summer months. Fish need the cold water from groundwater to migrate and spawn.

The Redmond-Bear Creek Groundwater Protection Committee has been discussing priorities for the King County Groundwater Protection Program in its GWMA. The committee has worked to identify top priorities with the expectation that implementing agencies will use these priority statements to guide their provision of groundwater protection services.

Key implementing agencies are the Cities of Redmond, Sammamish, and Woodinville; local water utilities and districts; the King County Department of Natural Resources and Parks (DNRP); the King County Department of Development and Environmental Services; Public Health - Seattle & King County; water purveyors; and the Washington State Department of Ecology.

Based on direction from the groundwater protection committee, King County proposes a water resources evaluation, policy and plan implementation services, and education and outreach to help protect groundwater in the Redmond-Bear Creek Valley Groundwater Management Area.

## **I. WATER RESOURCES EVALUATION**

### **PRIORITIES AND OBJECTIVES**

The Redmond-Bear Creek Groundwater Protection Committee identified the following as the most important groundwater data issues:

- Identify areas of surface water and groundwater interaction. Much of the shallow groundwater appears to be in direct communication with Bear Creek, Evans Creek, Cottage Lake Creek, Cold Creek, or other streams, all of which contain significant salmonid migration or spawning habitat. Overuse of these shallow resources could put threatened salmon in jeopardy.

- Identify trends in water quantity and water quality. As development has occurred in the GWMA, runoff has been diverted to surface water and could be reducing groundwater recharge. In addition, groundwater withdrawals have been increasing for this same development. Together, these factors could be reducing groundwater quantity. Groundwater quality is also threatened by many land uses in the area.
- Identify groundwater sensitive areas. Inappropriate land uses could contaminate the recharge areas of the GWMA's significant shallow groundwater resources. Both the City of Redmond and King County have recently proposed aquifer protection ordinances, but both ordinances require mapping of surficial geology to determine priority areas of high susceptibility.
- Collect, manage, and distribute groundwater data relevant to the GWMA. To be useful, groundwater data that is obtained by any agency should be combined with all other data. This can be accomplished through a central "clearinghouse," but the public, particularly the consulting community, can also combine the data.

### **EXISTING SOURCES OF GROUNDWATER DATA**

There are a number of existing sources of groundwater data for the GWMA, including the following:

- The Area Characterization work for the Redmond-Bear Creek Valley Groundwater Management Plan provides the overall basis of the hydrogeology of the GWMA, although the data for variable conditions (water levels and water quality) are not current.
- Ambient groundwater monitoring by DNRP has updated the water quality and water level data for many of the wells covered by the management plan, but there are many other wells that could not be included in this update.
- DNRP has been conducting a study of groundwater in the Sammamish River Valley under Wastewater Treatment Division funding. This ongoing study includes installing monitoring wells, pumping tests, and modeling.
- A limited number of hydrogeologic studies have been conducted in the GWMA, mainly for purveyors. Several studies, which included groundwater flow modeling, were conducted for the City of Redmond. The Union Hill Water Association developed hydrogeologic wellhead protection plans. The wellhead protection areas for the Northeast Sammamish Sewer and Water District appear to be based on the Calculated Fixed Radius method however, new hydrogeologic-based data may soon be available. A temperature-based study of surface water/groundwater interactions has been conducted for the Union Hill Water Association, and the Northeast Sammamish Sewer and Water District, but the report is not available at the time of this plan.
- The Redmond Ridge development has a number of monitoring wells to assure that groundwater impacts are minimized. They have also researched the hydrostratigraphy in some detail.
- The Washington State Department of Ecology has made its well log data available via the Internet.
- USGS and King County DNRP, have maintained stream gages and obtained data over an extended period of time that can provide baseline data for flows in the Sammamish River, Lake Sammamish, Bear Creek, Evans Creek, and many of their tributaries.
- USGS has performed studies in many areas around the US, to develop method for estimating surface water – groundwater interactions.
- Seattle District, Corps of Engineers, has responsibility for the Sammamish River, and to assure that it can carry flood flows. As such, they have models to predict flows and water levels in the river. The Corps was also involved in development of the Sammamish River Corridor Action Plan. USGS stream gage data.

These data are not comprehensive or completely up to date. In order to address the priorities listed above and meet the stated objectives, it will be necessary to collect new data as well as to compile the existing data sets.

### **PROPOSED SERVICES**

To address the priorities discussed by the Redmond-Bear Creek Groundwater Protection Committee, King County proposes that the committee invest in a three-year program to obtain additional hydrogeologic data for the GWMA ("Study Area"). In general, the work will not focus on making management recommendations, and the efforts involved with the water resources evaluation will not duplicate existing work, particularly in the Evans Creek area. This program would consist of the following work items, broken out by year:

- 2005 – Review previous surface water/groundwater interaction studies, develop a work plan, and initiate studies; continue stream flow and precipitation gaging; initiate database and Web page development; begin geologic mapping.
- 2006 – Continue the surface water/groundwater interaction study; continue stream flow and precipitation gaging; maintain the database and Web pages; continue geologic and susceptibility mapping.
- 2007 – Complete geologic and susceptibility mapping; continue stream flow and precipitation gaging; maintain the database and Web pages; complete surface water/groundwater interaction study.

This water resources evaluation would provide data that can be used to inform decision-makers about the impact of land-use changes, water withdrawals, and climate change on groundwater supplies within the study area. This data set could be used to help develop a long-term monitoring strategy for groundwater in the area and identify future needs, if any, for more possible groundwater modeling.

## **SURFACE WATER/GROUNDWATER INTERACTION STUDY**

DNRP is proposing a pilot project to help quantify groundwater movement near streams. This proposal is based on a number of studies, in the Study Area and elsewhere, including the following:

- temperature-based studies by the USGS across the country
- the results of several studies under the Sammamish River Valley Groundwater Study, including “mini-piezometer” work by Ecology, and clusters of monitoring wells with water level and temperature logging.

The proposed study would be used initially to assess the Cold Creek Aquifer area and some nearby basins such as Cottage Lake Creek and Daniels Creek. Some details for this proposed study will be developed when the final reports for the previously mentioned studies are complete.

The five main tasks required to complete the interaction study are described below.

### **Task 1: Review Previous Studies**

Review previous studies.

### **Task 2: Develop Work Plan**

Develop a work plan and present it to the Redmond-Bear Creek Groundwater Protection Committee.

### **Task 3: Develop Monitoring Methods**

Install temperature probes and mini-piezometers, and utilize other monitoring methods.

### **Task 4: Make Observations**

Observe water levels and temperature fluctuations.

### **Task 5: Make Calculations**

Calculate interaction factors between surface water and groundwater.

## **STREAM FLOW AND PRECIPITATION GAGING**

As of 2004, DNRP monitors six sites for stream flow within the Bear Creek Valley (three on Big Bear Creek, one on Evans Creek, one on Cottage Lake, and one on Cold Creek). King County also has a full-service weather station and two additional precipitation gages within this area. These current levels of surface water monitoring are based on Surface Water Management (SWM) funding, with some telemeter costs being supported by the Northeast Sammamish Sewer and Water District. This body of work also includes a basin-wide assessment of all measurable streams over a short time period (two to three days). Finally, new gages may be installed if the proposed level of funding is made available.

The three main tasks required to complete the gaging are described below.

**Task 1: Continue Monitoring**

Continue stream flow and precipitation monitoring.

**Task 2: Install Gages**

Install new gages as possible.

**Task 3: Provide Data**

Provide data via DNRP hydrology Web pages.

**GEOLOGIC AND SUSCEPTIBILITY MAPPING**

DNRP is proposing to contract with the University of Washington's GeoMapNW (formerly the Seattle-Area Geologic Mapping Project) to perform geologic mapping of an area both within and adjacent to the GWMA. Benefits of this mapping effort would include defining groundwater recharge areas with new susceptibility and maps.

The five main tasks required to complete the mapping are described below.

**Task 1: Define Study Area**

Only a portion of the Redmond-Bear Creek Valley Groundwater Management Area and adjacent areas will be mapped. A current priority area is the Cottage Lake and Cold Creek area. Some aspects of this mapping have already been accomplished in the Sammamish River Valley, the Woodinville and the North Redmond areas. We propose to complete these areas (mainly the surficial geologic mapping and input of hydrologic parameters) and to extend the study to the Bear Creek basin. The selection of actual mapping areas will be approved by the PMT.

**Task 2: Collect Subsurface Geologic Data**

Collect subsurface geologic data (such as borehole or well logs) for the mapping area from sources at King County, with cities and purveyors, in state agency offices in Olympia, and elsewhere.

**Task 3: Provide Database**

Provide a database that includes both groundwater information and a list of boring logs in the mapping area.

**Task 4: Perform Geologic Field Mapping and Updates**

Perform geologic field mapping in the mapping area to aid in the development and verification of geologic units for interpretation of maps and cross-sections; use these data to update previous geologic mapping (to a 1:24,000 scale) and create geologic cross-sections of the mapping area.

**Task 5: Map Susceptibility**

Provide a map that indicates a high, medium, or low susceptibility to groundwater contamination for each reinterpreted geologic unit in the study area to allow for future revision of central aquifer recharge areas (CARA) as needed.

**REDMOND-BEAR CREEK VALLEY GROUNDWATER DATABASE/WEB PAGE**

DNRP currently has software (EQuIS) that allows compilation of groundwater data. DNRP staff is trying to obtain the most up-to-date groundwater data from a variety of sources within the Redmond-Bear Creek Valley Groundwater Management Area as well as the rest of King County. With the completion of this project, the groundwater data will be available to the public via interactive Web pages.

The three main tasks required to complete the groundwater database/Web pages are described below.

**Task 1: Compile Existing Data**

Compile available GWMA-specific groundwater data.

**Task 2: Program Web Page**

Program the Web pages to allow interactive data downloading.

**Task 3: Update Information**

Update the information on an annual basis.

**WATER RESOURCES EVALUATION DELIVERABLES**

**Table 1. Proposed Water Resources Evaluation Deliverables by Year**

Year	Deliverables
2005	<ul style="list-style-type: none"> <li>• Work plan for surface water/groundwater interaction study; initiate hydrogeologic mapping; mid-project progress report</li> <li>• Provide stream flow and precipitation gaging data via DNRP hydrology Web pages.</li> <li>• GWMA-specific groundwater database programmed; Web pages available to the public.</li> </ul>
2006	<ul style="list-style-type: none"> <li>• Surface water/groundwater interaction study continues; continue hydrogeologic mapping.</li> <li>• Provide stream flow and precipitation gaging data via DNRP hydrology Web pages</li> <li>• GWMA-specific groundwater database/Web pages maintained</li> </ul>
2007	<ul style="list-style-type: none"> <li>• Complete geologic and susceptibility mapping, produce new map</li> <li>• Provide stream flow and precipitation gaging data via DNRP hydrology Web pages</li> <li>• GWMA-specific groundwater database/Web pages maintained</li> </ul>

**WATER RESOURCES EVALUATION ESTIMATED COSTS**

The total estimated cost for the water resources evaluation is \$456,000 over three years. Of this total, DNRP will contribute \$210,000 from the SWM fund to continue and extend stream and precipitation gaging. Thus, new (non-SWM) costs for this effort will be \$246,000.

**Table 2. Water Resources Evaluation Estimated Costs by Work Item**

Work Item	Year	Labor (FTE)*	Material, Lab, or Consultant Costs	Total Cost
Surface Water/Groundwater Interaction Study	2005-2007	0.79	\$33,077	\$141,600
Stream Flow and Precipitation Gaging	2005-2007	1.50 SWM fund	-----	\$210,000
Geologic and Susceptibility Mapping	2005-2007	0.10	\$75,000	\$89,000
GWMA-specific Groundwater Database/Web Pages	2005-2007	0.11	-----,	\$15,400
<b>TOTAL</b>		<b>2.50</b>	<b>\$108,077</b>	<b>\$456,000</b>

\*Labor costs vary, but are based on \$140,000 per FTE per year.

**Table 3. Water Resources Evaluation Estimated Costs by Year**

Year	Work Item/Task	Labor (FTE)*	Material, Lab, or Consultant Costs	Total Costs
2005	Stream Flow & Precipitation Gaging	0.5		\$ 70,000
2005	SW/GW Interaction Study	0.12	\$ 23,277	\$ 39,000
2005	UW Mapping	0	\$ 36,000	\$ 36,000

2005	GWMA - specific groundwater database & web services	0.05		\$ 7,000
	<b>2005 Total</b>	<b>0.67</b>		<b>\$ 152,000</b>
2006	Stream Flow & Precipitation Gaging	0.5		\$ 70,000
2006	SW/GW Interaction Study	0.47		\$ 64,800
2006	UW Mapping	0	\$ 13,000	\$ 13,000
2006	GWMA - specific groundwater database & web services	0.03		\$ 4,200
	<b>2006 Total</b>	<b>1</b>		<b>\$ 152,000</b>
2007	Stream Flow & Precipitation Gaging	0.5		\$ 70,000
2007	SW/GW Interaction Study	0.2	\$ 9,800	\$ 37,800
2007	UW Mapping	0.1	\$ 26,000	\$ 40,000
2007	GWMA - specific groundwater database & web services	0.03		\$ 4,200
	<b>2007 Total</b>	<b>0.83</b>		<b>\$ 152,000</b>
	<b>TOTAL</b>	<b>2.5</b>		<b>\$ 456,000</b>

\* Labor costs are based on \$140,000 per FTE per year; labor costs may vary.

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Total RBC Groundwater Program 3-year financial overview

### Detail for RBC Groundwater ILA Services

#### **Budget**

	Year:	2005	2006	2007	Average Annual FTE	Comments
<b>Science</b>						
	Stream flow and precipitation gaging	\$ 70,000	\$ 70,000	\$ 70,000	0.50	
	SW/GW Interaction	\$ 39,000	\$ 64,800	\$ 37,800	0.12	(.47 in '06/.20 in '07)
	UW Mapping	\$ 36,000	\$ 13,000	\$ 40,000	0.10	(in '07 plus UW Staff)
	GW data base & web service	\$ 7,000	\$ 4,200	\$ 4,200	0.05	(.03 in '06/'07)
	<b>Science subtotal</b>	<b>\$ 152,000</b>	<b>\$ 152,000</b>	<b>\$ 152,000</b>	<b>0.77</b>	
<b>Education</b>						
	Education web site coordination of materials	\$ 8,282	\$ 8,282	\$ 8,282	0.05	
	Annual Educators GW Forum	\$ 16,565	\$ 16,565	\$ 16,565	0.10	

	4 GW Articles	\$ 8,282	\$ 8,282	\$ 8,282	0.05	
	<b>Education subtotal</b>	<b>\$ 33,129</b>	<b>\$ 33,129</b>	<b>\$ 33,129</b>	<b>0.20</b>	
<b>GWPC</b>						
	GWPC logistics; notes, schedules, agendas	\$ 18,361	\$ 18,361	\$ 18,361	0.06	
	GW Policy and Subcommittee work	\$ 7,787	\$ 7,787	\$ 7,787	0.05	
	<b>GWPC subtotal</b>	<b>\$ 26,148</b>	<b>\$ 26,148</b>	<b>\$ 26,148</b>	<b>0.11</b>	
<b>RBC Program</b>		<b>\$ 211,277</b>	<b>\$211,277</b>	<b>\$211,277</b>	<b>1.08</b>	

Project Cost Shares

	2005 Cost Share %	2005 Estimated Cost (\$)	2006 Cost Share %	2006 Estimated Cost (\$)	2007 Cost Share %	2007 Estimated Cost (\$)	TOTAL ESTIMATED COST (\$)
King County	57%	\$120,000	57%	\$120,000	57%	\$120,000	\$360,000
City of Redmond	19%	\$40,000	19%	\$40,000	19%	\$40,000	\$120,000
City of Woodinville	7%	\$15,000	7%	\$15,000	7%	\$15,000	\$45,000
City of Sammamish	2%	\$5,000	2%	\$5,000	2%	\$5,000	\$15,000
Additional Revenues *	15%	\$31,277	15%	\$31,277	15%	\$31,277	\$93,831
<b>Grand Total</b>		<b>\$211,277</b>		<b>\$211,277</b>		<b>\$211,277</b>	<b>\$633,831</b>

\* Additional Revenues will be pursued on an annual basis with King County acting as fiscal agent.